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Juvenile Justice Interventions: System Escalation and Effective Alternatives to Residential Placement

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*The overarching goals of the evaluation are to assess the use of community-based interventions as an alternative to residential commitments for delinquent youth; and determine why some youth escalate from community-sanctions to residential placement. Using logistic regression and propensity score matching techniques, the study examined pathways through the continuum of care, and the relative effectiveness of probation and residential dispositions. All youth disposed to either juvenile probation (*n = *2,823) or residential facilities (*n = *269) in Connecticut between July 1, 2005 and June 30, 2007 were included in the study. The results demonstrate that delaying delinquency and increasing family protective factors help prevent youth escalation through the system. Further, an assessment of comparable probation and residential placements revealed that probationers had significantly lower recidivism than those placed in commitment programs. These findings suggest that community-based supervision is an effective alternative to more restrictive and costly residential services for some juvenile delinquents; and highlight important considerations for reducing system escalation.*

KEYWORDS community-based programs, juvenile, probation, recidivism, residential

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Addressing juvenile crime has become more important in recent years with many jurisdictions facing severe budget reductions, fewer programs and rising unease about juvenile offenders (Campaign for Juvenile Justice, 2012). While juvenile offenders only account for about 20% of the crimes known to the police (Federal Bureau of Investigation, 2004), their delinquency can be very costly. Cohen (1998) put the average cost of one repeat juvenile offender at $1.3 to $1.5 million dollars. And the social and economic price does not stop when the youthful offender turns 18; in fact 25% of all juvenile delinquents delve deeper into the system—further burdening the juvenile and adult systems, and victimizing innocent people (Office of Juvenile Justice and Delinquency Prevention, 2006).

From a policy perspective, legislators and administrators are expected to use public funds wisely on interventions that effectively prevent system escalation and future crime and delinquency, as both can become costly aspects of the crime control response. In recent years there has been some evidence to support programmatic shifts towards less expensive, but equally effective, community-based options for juvenile delinquents (Andrews et al., 1990; Andrews & Bonta, 2006) with reports that community programs had a larger impact on recidivism than residential facilities. Further, serving these youth in the community reduces reliance on costly residential programs, keeps the youth in prosocial environments and has the potential to achieve similar or better outcomes.

Based on the assumption that many juvenile delinquents could be served effectively and efficiently in the community, the Connecticut Court Support Services Division (CSSD) and Department of Children and Families (DCF) developed a joint Strategic Plan, which promoted an increased reliance on community-based supervision instead of residential commitment (Child Welfare League of America, 2006). The collaborative effort also highlighted the need for research on probation and residential placements, how juveniles progress through the system and what factors impact client success after program completion. Utilizing CSSD and DCF data, the goals of the evaluation are to explore the use of juvenile probation as an effective alternative to residential programs; and examine which factors predict escalation through the system. The following analysis provides an overview of prior research on delinquency interventions and evidence-based programs. Following a description of the study methodology, the discussion reports the study findings, and addresses the practical relevance of the results.

LITERATURE REVIEW

Over the last 35 years, a body of literature on juvenile interventions featuring rigorous designs has accumulated and has now been systematically reviewed. Research has focused on which risk factors account for the greatest

variability in antisocial behavior (Loeber, 1990; Huizinga, Esbensen, & Weiher, 1991; Moffit, 1993; Sampson & Laub, 1994). Studies have likewise identified treatments that are most effective in mitigating these risk factors resulting in lower rates of recidivism (Lipsey & Wilson, 1998; Lowenkamp, Makarios, Latessa, Lemke, & Smith, 2010). The number of investigations has grown, and the quality has improved to the extent that systematic reviews are now commonplace. Indeed, so many meta-analytic reviews have been produced from this body of literature that researchers are able to collect them and produce a "review of reviews" (Lipsey & Cullen, 2007). In view of the evidence, it can now be said with confidence that treatment programs are capable of reducing recidivism rates among serious offenders.

Along with other researchers including James Bonta, Robert Hoge, and Paul Gendreau, Andrews developed the principles of risk, need and responsivity based on the results of meta-analytic reviews of the literature (Andrews & Bonta, 2006). Drawing from their studies, they pioneered a strategy for correctional interventions that began with assessing individuals for the risk to recidivate and targeting those at the highest risk, as a key to providing the greatest recidivism reduction effects. This reasoning can, in part, be traced to Wolfgang, Figlio and Sellin's (1972) seminal work documenting that a small number of offenders are responsible for the majority of criminal offending; as well as findings from the meta-analyses suggesting that disparity between the risk of the offender and intensity of correctional interventions may actually increase the likelihood for recidivism rather than reduce it (Andrews et al., 1990). By targeting dynamic personal, familial and social risk factors that are the strongest predictors for recidivism, as opposed to static, non-criminogenic needs; Andrews and his colleagues argued that greater success could be achieved, especially in view of scarce resources. As a key part of a cost-effective strategy, their research revealed which treatments for these risk factors were proven most effective. By matching offenders to treatment based on their individual risk and needs, and taking into account their learning style and personal characteristics, rehabilitative treatment could be made more efficient and effective.

Matching offender characteristics to the types of commitment or community-based programs that are effective at reducing those risks is the strategy most states are now adopting to control costs and achieve a greater return on investment. Several studies document the relative benefits of utilizing less restrictive community-based interventions and/or probation services to reduce juvenile recidivism. For instance, Andrews et al. (1990) and Andrews and Bonta (2006) reported that community initiatives were more effective than residential programs. They also found that the negative impact of inappropriate interventions was higher for those placed in commitment programs. Research by Mark Lipsey has produced mixed results. A 1998 study by Lipsey and Wilson reported no significant difference in outcomes between community-based services and residential commitments.

However, Lipsey (1999) found that juvenile probation and parole effect sizes were larger than those for residential placements. Further, Lowenkamp, Latessa, and Holsinger (2006) reported that there were no significant differences in the two intervention approaches. However, they did note that intervention effectiveness varied in accordance with adherence to evidence-based practices. Drake, Aos, and Miller's (2009) meta-analysis of over 500 correctional programs found a number of effective community-based treatment programs that were reasonably priced and demonstrated positive returns. While community-based options were significantly related to positive outcomes, the most powerful predictors of success were treatment type, quality and offender characteristics. In contrast, Lipsey (2009) did not find any differences in recidivism across a variety of juvenile dispositions (controlling for risk).

Research on the effectiveness of probation or other community-based sanctions with adult populations is less supportive of its effectiveness at reducing future system involvement. Several recent studies (Solomon, Kachnowski, & Bhati, 2005; Aos, Miller, & Drake, 2006; Bonta, Rugge, Scott, Bourgon, & Yessine, 2008; Green & Wink, 2010) have all reported limited or no positive relationship between probation/supervision, future behavior and recidivism. However, a recent review of community supervision research (Drake, 2011), demonstrates that when coupled with treatment and/or the risk and need responsivity approach, supervision can substantially reduce recidivism (see also Kimora, 2008). Steiner, Makarios, Travis, and Meade (2012) also reported that formal community-sanctions, when coupled with informal stakes in conformity, did improve recidivism for a sample of parole violators.

Examining the movement of probationers deeper into the juvenile and adult systems is equally discouraging. Minor, Wells, and Angle (2012), reported that 62% of their sample of residential placements had prior probation dispositions. In addition, a recent study in Delaware found that during roughly the same time period, 8% of their juvenile probationers went into deeper end programs (State of Delaware, 2009).

Collectively, the juvenile and adult research on the effectiveness of community-based services, such as probation or in-home interventions, provides limited evidence that it can successfully reduce future system involvement or escalation. It is important to note that the there are differences in adult and juvenile probation that could potentially account for the slightly more promising results with juvenile offenders. As noted by Taxman (2002), adult supervision is often characterized by periodic "check-ins" and high caseloads, as opposed to meaningful and engaged interaction (although Drake, 2011, indicates practices are improving in some areas). In contrast, Connecticut's juvenile probation involves much more than occasional check-ins. Probation officers are trained in evidence-based models such as motivational interviewing and strengths-based case management, and an individualized treatment and monitoring plan is developed for each probationer.

The current evaluation extends prior research in important ways. First, the study uses appropriate statistical methods (propensity score matching, PSM) to control for selection bias issues in estimating the relative effect of probation and residential placements on recidivism. The importance of doing so cannot be overstated, as failure to address sample selection problems can result in invalid findings. Further, this is one of only a few studies that directly compare recidivism outcomes for a sample of juvenile probation and residential placements.[1]Finally, the assessment explores the characteristics of youth who escalate through the system and ultimately require residential programming.

METHODOLOGY

Evaluation data came from multiple sources: CSSD Case Management Information System (CMIS), the Connecticut Computerized Criminal History (CCH) records system, and the Connecticut DCF Information System. The data set included information on youth demographic characteristics such as age, race and gender. The files also included information on referral and offense history, dispositions, placements, risk and needs, and youth juvenile and adult justice system involvement.[2]

The analysis includes measures of the client's age at admission to the program, their gender (male or female) and race/ethnicity (Black, White, Hispanic), as reported to CSSD. The evaluation also incorporates the delinquent's age at first offense. Unique probation and residential placement, and assignment duration, was calculated using standardized criteria. Information from CSSD and DCF showed considerable youth movement within the system, and many clients had more than one placement with multiple admission and release dates. Disposition data were used to define the type of placement: probation supervision or residential commitment. Then admission and release dates were used to define assignment duration. The beginning of probation or residential services was determined by the admission date provided in the data. The completion of services was established by the probation or residential placement end date. There were cases with release or end dates, and readmission dates, within 30 days of one another. In these cases if the placements were of the same type (probation or residential), they were coupled or added to the prior assignment. If the client was released from services, and not disposed to probation or residential programs within 30 days, any subsequent justice system assignment (additional probation or residential dispositions) was defined as a unique placement. CSSD and DCF data systems do not record completion reasons, only release or end dates. Both agencies assume that those with a release or end date have successfully completed the terms of their probation or residential/commitment placement. Therefore completion was defined as any youth released from a

residential facility or probation supervision, and not placed into a residential setting or supervision term within 30 days of program end date. Establishing a completion date ensures that the study captures subsequent justice system involvement after the youth completes the full intervention.

CSSD evaluates juvenile risk and need using the Juvenile Assessment Generic (JAG), a validated risk measurement instrument (The Justice Education Center, 2006). The JAG measures criminal history, substance use, risk taking behaviors, family functioning, peer relationships, clients' stake in conformity, and personal values. Scores are aggregated into total protective and risk values. Summary scores are presented for criminal risk; substance use; family; peer and personal risk and protective domains.[3] The analysis also includes seriousness index scores for prior referrals and adjudications. These measures capture offense gravity for both prior referral/arrest and adjudication/conviction. A weighted system assigns point values to specific offense types. As crime seriousness increases, so does the seriousness score (violent felony = 8, property or other felony = 5, misdemeanors = 2, and other offenses = 1; Florida Department of Juvenile Justice, 2010a, 2010b).

Anecdotal information was available through case files and other assessment documentation on the services provided through probation and residential programs. These include a mix of community-based interventions (for example Motivational Enhancement Therapy, Parenting with Love, and aggression replacement therapy), therapeutic approaches (for example Multisystemic Therapy, Functional Family Therapy, and individual counseling), and enrichment programs (summer camps, experiential learning). Connecticut relies heavily on evidence-based initiatives and promotes their use in probation and commitment programs; and there is anecdotal evidence that probationers and residential youth received similar services. Unfortunately data on the type, duration and quality of individual level services were not available for the evaluation and could not be used in the assessment of youth involvement with the justice system.

Probation violations, juvenile referrals, adult arrests, and adjudications and convictions, are common indicators of involvement in the justice system. Referrals and arrests demonstrate client contact with law enforcement, and may point to deviant or delinquent behaviors. Whether the juvenile actually committed an offense is indicated by a subsequent adjudication or conviction. Adjudication is generally considered a more accurate measure of delinquent behavior. Recidivism, operationally defined as any adjudication or conviction within one year of program completion, is the primary focus of the assessment (this definition is consistent with prior research on juvenile recidivism, see Myner, Santman, Cappelletty, & Perlmutter, 1998; McMackin, Tansi, & LaFratta, 2004; Florida Department of Juvenile Justice, 2010a, 2010b).

The historical sample of probation[4] and residential[5] clients included all youth disposed to either juvenile probation or commitment to residential placement, and released between July 1, 2005 and June 30, 2007. Those who

successfully complete either probation or commitment programming meet the criterion for the outcome analysis sample ($N = 3{,}092$). There were 2,823 probation releases during this time period; and 269 residential releases in this timeframe. Table 1 presents summary statistics for probation and residential clients released from services between July 1, 2005 and June 30, 2007.

The probation sample is comprised primarily of male youth (approximately 76%); and 34% of the study group is White. The average age at first offense for all probation releases in the sample is 13 years of age. The average prior referral seriousness index score for all releases is 25 (the range is 1 to 300). The average prior adjudication seriousness index range is 1 to 385; and the average for all releases is 17. The average Juvenile Assessment Generic (JAG) risk and protective scores are 13 and 35, respectively. Of the probationers, 49% and 34% were referred/arrested or adjudicated/convicted within one year of release, respectively. Most of the residential releases in the sample were male (81%) youth. More than half of the releases were non-White (78%). The average age at first offense was approximately 12 years old. The average prior referral seriousness index score for all releases is 54 (the range is 4 to 234). The average prior adjudication seriousness index range is 1 to 180; and the average for all releases is 34. The average JAG risk and protective scores are 17 and 31, respectively. Referral/arrest rates for the residential group were 68%; and the adjudication/conviction rate was 53%.

The study used a two-pronged approach to answer the research questions. First, a modified quasiexperimental posttest only (with nonequivalent

TABLE 1 Probation and Residential Sample: Descriptive Statistics

	Probation ($N = 2{,}823$)		Residential ($N = 269$)	
Probation and Residential Descriptive Statistics	*M*	*SD*	*M*	*SD*
Age at first offense	13.14	1.75	12.06	1.87
Gender (0 = Female, 1 = Male)	0.76	0.43	0.81	0.4
Race (0 = other, 1 = White)	0.34	0.47	0.22	0.42
Prior charge seriousness index	25.02	27.69	53.83	40.29
Prior adjudication seriousness index	17.13	22.93	33.8	29.62
JAG Total Risk Score	13.45	6.23	16.58	7.33
JAG Total Protective Score	34.77	6.97	30.92	7.62
JAG Total Criminal Score	0.97	1.10	1.29	1.2
JAG Total Substance Use Risk Score	0.98	1.58	1.24	2.02
JAG Total Substance Use Protective Score	10.23	2.21	9.93	2.52
JAG Total Family Risk Score	3.41	2.09	3.83	2.30
JAG Total Family Protective Score	4.42	1.91	3.55	1.98
JAG Total Peer Risk Score	4.98	3.12	6.24	3.41
JAG Total Peer Protective Score	14.61	4.03	12.67	4.47
JAG Total Personal Risk Score	3.10	2.01	3.98	2.05
JAG Total Personal Protective Score	5.52	1.66	4.76	1.75
Referral/Arrest within One Year of Release	49.13	0.50	68.40	0.47
Adjudication/Conviction within One Year of Release	34.22	0.48	53.16	0.50

groups) was used to explore escalation through the system. Quasi-experimental methods are often used in the absence of random assignment, as is usually the case with historical sampling. This design allows for reliable statistical analysis of comparison groups by introducing control measures into the modeling process—in this case logistic regression. PSM, another quasi-experimental approach, was used to create balanced comparison groups and then simple *t*-tests were conducted to determine the relative impact of probation and commitment placement on recidivism.

With any subsample analysis (residential placements are a subsample of all probationers) there is concern of selection effects. PSM, a technique that simulates causal modeling in non-experimental conditions, statistically controls for inherent differences between the two groups (probation and residential placements); and is commonly used to addresses selection bias issues. Selection bias, by definition, occurs when a nonrandom sample is selected from a population (Bushway, Johnson &, Slocum, 2007). According to Bushway et al., sentencing research, in particular, is often impacted by selection bias because justice outcomes at various stages result in nonrandom subsamples through the continuum of justice processes. Accordingly, one could argue that a group of convicted probationers is an inherently biased subsample of all criminals because there are factors that impact the continuum of criminal justice processing from crime, to arrest, to prosecution, to sentencing; that are non-random. In simple terms, there is a concern that biased samples of a particular population differ in ways that are salient to study outcomes; criminal sanctions, for example. In a typical application, PSM compensates for possible biases imposed under non-experimental conditions (e.g., lack of randomization) by modeling the selection process related to placement, then comparing outcomes for subjects with a similar likelihood of probation dispositions, but different actual rates of supervision placement. It is important to note that PSM is limited to observed data; and failure to include key measures during the process can results in biased comparison samples.

The technique essentially controls for preprogram differences in juvenile offenders that could impact the probability of receiving services and the potential effect of the treatment. The study relied on Rosenbaum and Rubin's (1983) discussion of balanced samples to ensure an equitable comparison between youth completing probation services and residential programming. To accomplish this through propensity score matching, the sample excluded youth who had both probation and commitment placements during the study time frame (63 probationers and 47 residential youth). This resulted in a matching sample of 2,760 probationers and 222 residential youth.

Analysis of the bivariate correlation coefficients was used to narrow the list of PSM predictor variables from those in Table 1. Covariants with the strongest relationship with residential placement were chosen (excluding

those that exhibited strong [>.5] correlation with other variables).[6] The prediction model included the following factors: index score of prior referrals, age at first offense, gender and race. The scores were estimated in SPSS using R programs and SPSS R-plugins (Hansen, 2004; Hansen & Bowers, 2008; Ho, Imai, King, & Stuart, 2007a, 2011; Thoemmes, 2011). The SPSS matching program used logistic regression to calculate the probability of youth placement in residential programs versus probation supervision. The nearest neighbor algorithm was confined to one to one matching, no replacement of units and a conservative caliper (.15) to ensure balance between the two groups.

These parameters produced 209 matched pairs out of a possible 222 sets. This suggests considerable overlap between the probation and commitment youth (at least in terms of the predictor variables in the PSM model). While these parameters did result in the loss of 11 residential cases; the balance statistics indicate that the 209 matched pairs are comparable in terms of important covariants. For instance, the Hansen and Bowers (2008) omnibus test of balance was insignificant ($\chi^2(4) = 8.119$, $p = .087$); and the Iacus, King, and Porro (2011) test demonstrates that the level of "imbalance" was substantially higher (.766) in the prematched sample when compared to the balanced pairs (.464). Finally, Table 2 presents probation and commitment averages before and after the propensity score matching procedure and demonstrates how the PSM technique improves the similarity between the two groups. For instance, the standardized mean difference in age at first offense for probationers and residential youth prior to PSM was −.60 and .24 for the matched sample. Further, chi square analysis of group differences showed insignificant results, further demonstrating the comparability of the probation and residential youth selected for this analysis.

TABLE 2 Probation and Residential Means Pre- and Post-PSM

	Detailed balance before matching			Detailed balance after matching		
Probation and Residential Pre/Post-PSM	Commitment *M*	Probation *M*	Std. *M* Diff.	Commitment *M*	Probation *M*	Std. *M* Diff.[b]
Age at first offense	12.08	13.16	−0.60	12.15	12.19	−0.02
Gender (0 = Female, 1 = Male)	0.80	0.76	0.11	0.79	0.82	−0.06
Race (0 = other, 1 = White)	0.23	0.34	−0.27	0.23	0.29	−0.14
Prior charge seriousness index	53.10	22.17	0.83	50.58	45.30	0.14
Prior adjudication seriousness index[a]	32.68	15.46	0.64	30.72	32.19	−0.05

[a]Not included in the predictive model due to correlation with prior charge index.
[b]A standardized mean difference larger than .25 would indicate significance.

RESULTS

The following statistical analyses examined probation and residential information drawn from CSSD and DCF data systems. Client disposition information was included in the assessment, as well as offense history, demographics and youth risk and needs. The study results provide insight into progression from community to residential placements, and community alternatives to commitment.

Predicting System Escalation

Understanding the progression of at-risk youth through the juvenile justice continuum of services is essential to providing appropriate interventions. The following analysis examines the characteristics of youth whose justice system involvement escalates from probation to residential placement. The models include all probation and residential completions in the study sample without commitment dispositions prior to July 1, 2005 ($n = 2{,}807$). A chi square analysis of demographic, risk/need and offense history factors demonstrate that there are significant differences between probation clients who escalate to residential services ($n = 83$) and those who do not ($n = 2{,}724$). While only 3% of probationers progress from supervision to residential placement; those who do are younger at first offense, more likely to be non-White, have higher JAG Total, Criminal, Substance Use, Family, and Personal Risk scores, and lower Family Protective values (all significant at the .10 level).

Additional logistic analyses[7] (Table 3) model the relationship between age at First Offense, Gender, Race, Referral Seriousness Index and JAG Family Protective scores; and residential placement within 1 year of completing probation terms.[8] As the age at first offense decreases, the probability or odds of residential placement increases substantially.

White juveniles placed on probation are significantly less likely to be committed within one year of program completion. Finally, the odds of residential placement are significantly lower for those with higher Family Protective scores. Figure 1 illustrates the average predicted probability of

TABLE 3 Predicting System Escalation: Logistic Regression Results

Logistic Regression Predicted Recidivism	Coefficient	*SE*	*Sig.*	Exp (*B*)
Gender (0 = Female, 1 = Male)	0.18	0.35	0.59	1.20
Race (0 = other, 1 = White)	−0.90	0.39	0.02	0.41
Age at first offense	−0.28	0.07	0.00	0.76
JAG Family Protective Score	−0.20	0.08	0.01	0.82
Referral Index Seriousness Score	−0.02	0.01	0.02	0.98

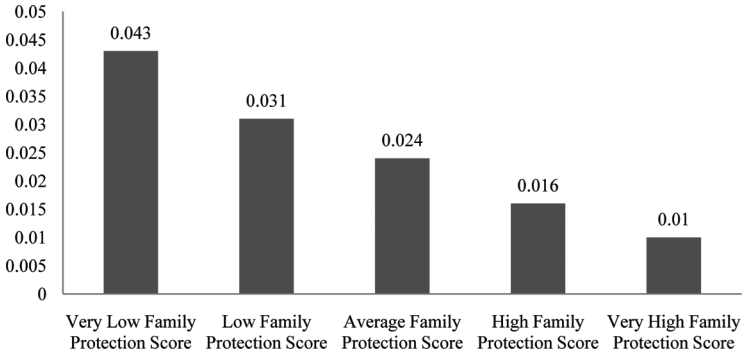

FIGURE 1 Predicted commitment escalation by family protection.

escalating to a more restrictive care setting by Family Protective scores (scores were taken from the JAG and divided into +/− 1 and 2 standard deviations from the mean). The figure shows that youth with very low Family Protection scores have the highest chance of system escalation, 4.4%. In contrast, the probability of escalation for those at the other end of the spectrum drops to less than 1%, a substantial change in youth outcomes.

Alternatives to Residential Placement

If probation services are effective alternatives to residential placement, one would expect comparable or better outcomes for probationers that "look" like residential commitments. PSM was used to create 209 pairs of similar probation and residential clients. *T*-test analyses of referral/arrest and adjudication/conviction outcomes within one year are presented in Table 4.

The results demonstrate that youth disposition (probation or commitment) did not significantly impact referral or arrest within one year of completing services. Adjudication or conviction within 1 year; however, was

TABLE 4 Matched Sample t-Test of Mean Difference: Probationers and Residential Youth

	Independent Samples *t*-tests				
				95% CI of the Difference	
Probationers and Residential Youth	*t*	Sig. (2-tailed)	*M* Difference	Lower	Upper
Referral/arrest within 1 year of completion	−1.01	0.31	−0.05	−0.14	0.05
Adjudication/conviction within 1 year of completion	−2.40	0.01	−.011	−0.21	−0.02

TABLE 5 Matched Sample Analysis: Predicted Recidivism

Referral/Arrest within 1 Year	Coefficient	*SE*	Sig.	Exp (*B*)
Commitment program (0 = No, 1 = yes)	0.45	0.31	0.15	1.57
JAG Total Risk score	0.04	0.02	0.06	1.04
JAG Criminal Risk score	0.06	0.11	0.61	1.06
Adjudication/Conviction within 1 Year	**Coefficient**	***SE***	**Sig.**	**Exp (*B*)**
Commitment program (0 = No, 1 = yes)	0.67	0.29	0.02	1.95
JAG Total Risk score	0.00	0.02	0.86	1.00
JAG Criminal Risk score	0.23	0.11	0.03	1.26

significantly higher for youth placed in residential programs in comparison to similar juveniles disposed to probation supervision.

Due to missing data, the PSM procedure did not balance probationers and residential placements in terms of JAG scores. To determine if the inclusion of this information would alter the findings; logistic regression models were computed with the two largest JAG predictors of recidivism or referral/arrest after release: Total Risk score and Criminal Risk score. As shown in Table 5, the inclusion of these covariants does not change the results demonstrated through the comparison of means. According to the logistic regression model, the predicted probability of recidivism for residential releases (holding constant JAG risk scores) is 58%; and 42% for probation releases.[9]

Determining which residential placements are likely to benefit from alternative probation services is not possible given the small sample in this analysis. However, the significant association between age at first offense and recidivism demonstrated in prior research points to a possible consideration in policy and programming decisions. For instance, (Figure 2) a

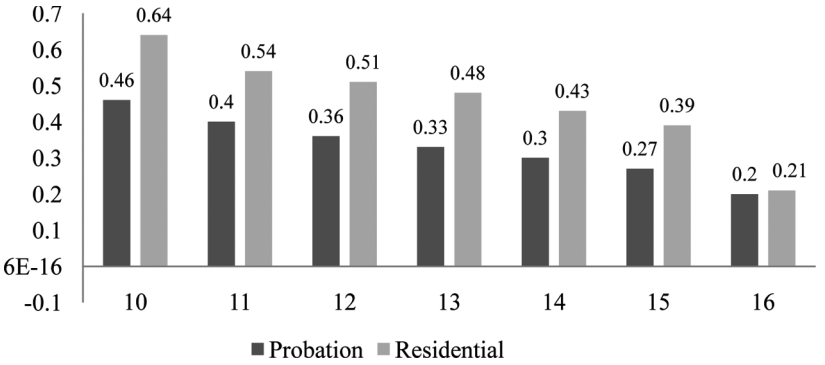

FIGURE 2 Predicted recidivism by placement and age at first offense.

probation client, who was 10 years old when they committed their first offense (and was balanced on other significant covariants), had a 46% probability of recidivism.

Keeping that same client out of the system until they are 16 decreases the probability of adult conviction or juvenile adjudication after probation completion to 20%. The predicted probability of recidivism for residential releases is 64% for a youth who is 10 years old at first offense. Increasing the age of first offense to 16 years old reduces the probability of recidivism to 21% for the same youth.

DISCUSSION AND RECOMMENDATIONS

Through PSM, *t*-tests, and logistic analyses, the study explored probation as an alternate to more restrictive residential placements and what drives system escalation. The assessment demonstrated that residential placements have higher rates of actual and predicted recidivism; holding constant demographic, risk/need and offense history. This finding is consistent with the recommendations of researchers such as Andrews (2006), Lipsey, Howell, Kelly, Chapman, & Carver (2010), and Drake (2011) that moderate- and high-risk delinquents should be disposed to the least restrictive levels of supervision and control, and the presumption that public safety will be better served by their placement in community settings that provide appropriate rehabilitative services. The analyses also examined the role of age at first offense on predicted recidivism. Youth who become officially involved in the justice system when they are younger have substantially higher odds of recidivism than those who stay out of the system longer. The modeling process further established that probation supervision is a viable alternative to residential placement for some juvenile offenders.

While this finding is not entirely unexpected, the use of PSM substantially improves the validity of this line of inquiry. PSM does have limitations related to the quality and type of information available for the procedure. The study did suffer from missing risk and needs data, and specific programmatic information. Analyzing the results with and without JAG data suggests that the findings are robust to this issue; however, without client level program information it is impossible to determine how it would impact the results. As is the case with any observational study, the results are dependent on comprehensive information related to the issue. This analysis included data on many factors related to system involvement including demographics, offense histories, family functioning, peer relationships, substance use, school achievement and substance use; factors all shown to be related to the outcomes. However, specific programming information was not available for each client and treatment type, duration and intensity measures could not be included in the study (factors also

shown to impact youth outcomes). While anecdotal evidence suggests that services are fairly uniform for all juvenile delinquents in Connecticut, the assessment does not account for the effect individual level treatment may have on delinquency.

Examining the differences between probationers with and without residential placements within one year of completing their supervision term also produced important findings related to more restrictive dispositions. The logistic model indicates that system escalation, defined as residential placement after probation completion, is related to age at first offense, race and the lack of protective factors.

Age at first offense is especially relevant in predicting system escalation. Early onset of anti-social or criminal behavior is a well-documented correlate of continuing delinquency (Andrews & Bonta, 2006; DeLisi, 2006), so much so that it is incorporated in risk assessment instruments. It is not surprising that it is also related to system escalation. The model indicates that as the age at first delinquent charge decreases the odds of escalating to a more restrictive environment, such as a residential facility, increase from less than 1% for those 15 or older at the time of their first referral to 5% for those ten or younger. The probability of escalation is also significantly higher for minority youth (3%) when compared to white juveniles (1%).

The role of the family as a shield for deeper end involvement is especially noteworthy as it alone among a host of risk/need factors significantly impacts system escalation. The relation between family support and delinquency also is well documented (Andrews & Bonta, 2006), and has received considerable attention as a target for such rehabilitative interventions as Functional Family Therapy, Multisystemic Therapy, and Parenting with Love and Limits. Positive relationships with parents, as well as the parent's ability to set and enforce limits are logical resilience factors that contribute to success, especially when exercised in the enduring environment of the youth in the community. As shown in Figure 1, shifting Family Protective scores from very low to very high reduces the chance of system escalation from over 4% to less than 1%.

This study marks an important advance in understanding justice system involvement for juveniles placed on probation supervision or assigned to residential programs, and why some youth require more intensive intervention. These preliminary results also point to future avenues of research to further explore how specific intervention models or approaches (such as Functional Family Therapy) impact youth outcomes. It is possible that the outcome differences demonstrated in this research are related to the type of intervention commonly used (for example, family treatments or substance use programming) at the time, as opposed to probation or residential placement.[10] Researchers should also look to program fidelity, and the frequency and intensity of the treatment as important factors in understanding the delinquency intervention process.

NOTES

1. Many studies focus on either residential programs or community-based sanctions, but not both, and/or rely on meta-analytic strategies to draw conclusions about the relative benefits of one approach over the other.

2. The systems did not have complete information on the actual interventions (for example Functional Family Therapy, VOICES, Girls Circle, etc.) used during the supervision or residential term.

3. The Department of Children and Families does not use the JAG to assess client risk and need resulting in significant missing data for youth in the residential group. Only 28% of all committed youth had JAG information, and that was drawn from CSSD data files, not DCF information systems.

4. Most delinquency cases are handled outside of the courts (roughly 60%); those that do involve judicial processing generally result in probation terms for juvenile delinquents (Court Support Services Division, 2011).

5. A small proportion of adjudicated delinquents are disposed to secure residential facilities operated by the Connecticut Department of Children and Families (DCF). Residential programs fall into two categories: specialized commitment programs operated by contract providers and Connecticut Juvenile Training Schools (CJTS). These programs are reserved for delinquents with the highest risk and needs, those who pose the greatest risk to society, and those who require more intensive services.

6. Significant missing data, particularly for the residential group, meant excluding JAG risk and needs data from the PSM process. To determine if the known information altered the results, logistic regression models were computed for each JAG measure significantly related to the outcome (either referral/arrest or adjudication/conviction). Controlling for the potentially cofounding influence of the JAG scores did not alter the results shown.

7. The logistic regression results demonstrate the expected outcomes (or odds ratio) of placement type; given the juveniles' demographic, risk, needs, legal, offense history, and other extra legal factors.

8. Not all significant correlates of system escalation were included in the logistic regression model because of collinearity among measures. For instance, type of offense (violent or nonviolent) and JAG Total Risk score were strongly related to prior offense seriousness index. Logistic regression variables were selected based on the strongest correlation with the outcome.

9. The predicted probability of referral or arrest was 72% and 63%, respectively for residential and probation youth respectively; however, this difference is not statistically significant.

10. Although this is unlikely in Connecticut because DCF and CSSD both rely heavily on the same evidence-based treatment approaches.

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